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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MARKHAM, WESLEY D	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Kw

Office Action Summary	Application No.	Applicant(s)
	09/739,477	ZHANG, YUEGANG
	Examiner	Art Unit
	Wesley D Markham	1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 June 2004 and 24 August 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,3-17 and 19-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,3-6,9-13,15-17,20-24,27-31,33 and 34 is/are rejected.

7)☒ Claim(s) 7,8,14,19,25,26 and 32 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 24 August 2004 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendments filed by the applicant on 6/28/2004 and 8/24/2004, in which a substitute specification (including a new title of the invention) was submitted, Claims 2 and 18 were canceled, Claims 1, 3, 4, 6, 7, 9, 10, 13 – 17, 19, 21, 22, 24, 25, 27, 28, and 31 – 34 were amended, and one (1) replacement sheet of drawings showing Figure 2 was submitted. **Claims 1, 3 – 17, and 19 – 34** are currently pending in U.S. Application Serial No. 09/739,477, and an Office Action on the merits follows.

Priority

2. Acknowledgement is made of the verified English language translation of Japanese priority document 11-359579 (filed on 12/17/1999), filed by the applicant on 6/28/2004. The examiner has reviewed the aforementioned translation and notes that Claims 1, 3 – 17, and 19 – 34 are fully supported by the Japanese priority document. As such, the Zhang et al. reference ("Controllable method for fabricating single-wall carbon nanotube tips", Applied Physics Letters, August 2000) no longer qualifies as "prior art", and the rejections based on Zhang et al. under 35 U.S.C. 102(a) and 35 U.S.C. 103(a), set forth in paragraphs 15 and 22 – 28 of the previous Office Action (i.e., the non-final Office Action mailed on 1/29/2004), <u>are withdrawn</u>.

Drawings

3. The objection to the drawings, specifically Figure 2, set forth in paragraph 5 of the previous Office Action, is withdrawn because the replacement sheet of drawings depicting Figure 2 filed by the applicant on 8/24/2004 is not blurry or unclear.

4. The amendment filed on 8/24/2004 (i.e., the replacement sheet of drawings depicting Figure 2) is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The "10 nm" length scale in the bottom right corner of the micrograph. Applicant is required to cancel the new matter in the reply to this Office Action.

Specification

5. The substitute specification filed on 6/28/2004 has not been entered because it does not conform to 37 CFR 1.125(b) and (c) for the following reason: The statement as to a lack of new matter under 37 CFR 1.125(b) is missing. As such, the objection to the title of the invention, set forth in paragraph 6 of the previous Office Action, is maintained.

Claim Objections

6. The objection to Claims 29 and 30, set forth in paragraph 7 of the previous Office Action, is withdrawn in light of the applicant's amendment to independent Claim 21 to more broadly recite "a nanotube" instead of "a carbon nanotube".

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. The rejection of Claim 30 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, set forth in paragraph 10 of the previous Office Action, is withdrawn in light of the applicant's amendment to independent Claim 21 to more broadly recite "a nanotube" instead of "a carbon nanotube".

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1, 3, 9 – 11, 13, 17, 20, 21, 27 – 29, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Jin et al. (USPN 6,283,812 B1).

11. Regarding independent **Claims 1 and 21**, Jin et al. teaches a method of processing a nanotube, specifically a method of forming a tip (i.e., a top) of a (carbon) nanotube (Abstract, Col.3, lines 5 – 49), the method comprising contacting a selected part of a nanotube (i.e., the ends of the nanotubes desired to be truncated) with a "solid state reactive substrate" (i.e., a solid metal or alloy having a high solid solubility of carbon) having a "defined edge" (i.e., the top of hot solid metal "40") (Figure 3B; Col.6, lines 39 – 43 and 66 – 67; Col.7, lines 1 – 8), heating (i.e., carrying out a heat treatment of) the solid state reactive substrate (Col.7, lines 1 – 4) to cause a "selective solid state reaction", specifically the dissolution of a desired length of the carbon nanotube ends by solid state diffusion (Col.7, lines 4 – 8), in a contacting region of the selected part of the nanotube (i.e., the nanotube ends) and the solid state reactive substrate to have the selected part become a reaction product (i.e., by dissolving only the desired length of the ends of the nanotube) (Col.7, lines 4 – 12), wherein a boundary between the reaction product and the nanotube is self-aligned to the defined edge (i.e., the top of hot solid metal "40") of the solid state reactive substrate (Figure 3B, Col.7, lines 4 – 12). In Jin et al., the "reaction product" is the product formed by the solid state diffusion and dissolution of the carbon nanotube ends into the carbon dissolving metal. Jin et al. does not explicitly teach separating the nanotube from the reaction product to define a top / end of the nanotube. However,

the process of Jin et al. involves rubbing the nanotubes against the hot, solid carbon-dissolving metal until a desired length of the ends of the nanotubes are dissolved and the nanotubes are truncated to a desired height (Abstract and Col.7, lines 1 – 14) to define a tip / end of the nanotube (Col.3, lines 40 – 49). This dissolution and truncation (i.e., reduction in length) of the carbon nanotubes would not occur in the process of Jin et al. unless the nanotubes were separated from the "reaction product" because, if the reaction product remained integral with the nanotubes, the length of the nanotubes would not be reduced and truncation would not occur. In other words, the "reaction product" (i.e., the product formed by the solid state diffusion and dissolution of the carbon nanotube ends into the carbon dissolving metal) is inherently separated from the nanotubes in the process of Jin et al. Regarding **Claim 3**, Jin et al. also teaches that the solid state reaction is caused by heating the reactive substrate (Col.7, lines 1 – 8). Regarding **Claims 9 – 11 and 27 – 29**, Jin et al. also teaches that the nanotube is a single-walled or multi-walled carbon nanotube (Col.4, lines 56 – 67, and Col.5, lines 1 – 21). Regarding **Claims 13 and 31**, Jin et al. also teaches that the reactive substrate is a metal (Col.7, lines 1 – 5). Regarding **Claim 17**, Jin et al. also teaches that the reactive substrate is in a solid state (Col.7, line 1). Regarding **Claim 20**, Jin et al. also teaches that the end of the nanotube is a tip (i.e., a top) of the nanotube (Figure 3B, Col.3, lines 46 – 48, Col.5, lines 4 – 5).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. <u>In the alternative</u> to the reasoning presented above in paragraph 11, Claims 1, 3, 9 – 11, 13, 17, 20, 21, 27 – 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (USPN 6,283,812 B1).

14. Specifically, Jin et al. teaches all the limitations of **Claims 1, 3, 9 – 11, 13, 17, 20, 21, 27 – 29, and 31** as set forth above in paragraph 11, except for a method comprising separating the nanotube from the reaction product to define a top / end of the nanotube. However, the process of Jin et al. involves rubbing the nanotubes against the hot, solid carbon-dissolving metal until a desired length of the ends of the nanotubes are dissolved and the nanotubes are truncated to a desired height (Abstract and Col.7, lines 1 – 14) to define a tip / end of the nanotube (Col.3, lines 40 – 49). Additionally, it is the desire of Jin et al. to truncate the ends of the carbon nanotubes in order to improve the emission properties of carbon nanotube arrays for use in microwave vacuum tube devices and flat panel field emission displays (Abstract, Col.1, lines 7 – 12, and Col.7, lines 54 – 56). Therefore, it would have been obvious to one of ordinary skill in the art to separate the nanotubes from the "reaction product" (i.e., the product formed by the solid state diffusion and dissolution

of the carbon nanotube ends into the carbon dissolving metal) in the process of Jin et al. with the reasonable expectation of successfully and advantageously reducing the length of the carbon nanotubes in the nanotube array of Jin et al. by separating the shortened nanotubes from the reaction product obtained in the shortening process, thereby successfully improving the emission properties of the nanotube array. In other words, it would have been obvious to one of ordinary skill in the art to separate the nanotubes from the reaction product in the process of Jin et al. because the reaction product appears to simply be a by-product of the nanotube truncation process and does not form part of the truncated nanotube array.

15. Claims 4, 5, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (USPN 6,283,812 B1) in view of either Schertler (USPN 4,461,665) or Ichinose et al. (USPN 4,224,379).

16. Jin et al. teaches all the limitations of **Claims 4, 5, 22, and 23** as set forth above in paragraph 11 or 14, except for a method wherein the reactive substrate (i.e., the hot solid metal "40") is heated by irradiation of a heat ray onto the solid state reactive substrate (Claims 4 and 22), specifically an infrared ray (Claims 5 and 23). Specifically, Jin et al. teaches that the solid metal is heated (Col.7, lines 1 – 5) but is silent regarding the method of heating the metal. This suggests to one of ordinary skill in the art that the specific method of heating is not particularly critical, so long as the metal is heated. Both Schertler (Col.5, lines 55 – 59) and Ichinose et al. (Col.13, lines 22 – 41) teach that metal substrates / assemblies can be heated by irradiating

an infrared ray onto the substrate. It would have been obvious to one of ordinary skill in the art to heat the solid metal of Jin et al. using IR rays (as taught by either Schertler or Ichinose et al.) with the reasonable expectation of (1) success, as Jin et al. is silent regarding the method of heating and both Schertler and Ichinose et al. teach that IR irradiation is a suitable method for heating a metal substrate, and (2) obtaining similar results, regardless of the specific method utilized to heat the solid metal of Jin et al.

17. Claims 6 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (USPN 6,283,812 B1) in view of either Tanabe et al. (USPN 6,296,894 B1) or Nagashima et al. (USPN 6,101,316).

18. Jin et al. teaches all the limitations of **Clams 6 and 24** as set forth above in paragraph 11 or 14, except for a method wherein the reactive substrate (i.e., the hot solid metal "40") is heated by applying a current between the reactive substrate and the nanotube. Please note that this heating process claimed by the applicant is equivalent to a "resistance heating" process (see page 12, lines 13 – 16 of the applicant's specification). Jin et al. does teach that the solid metal is heated (Col.7, lines 1 – 5) but is silent regarding the method of heating the metal. This suggests to one of ordinary skill in the art that the specific method of heating is not particularly critical, so long as the metal is heated. Both Tanabe et al. (Col.1, lines 15 – 39) and Nagashima et al. (Col.6, lines 46 – 49) teach that it was known in the art at the time of the applicant's invention to utilize a <u>resistance heating process</u> to heat a metal

object in which an electric current passes through / across the metal object. It would have been obvious to one of ordinary skill in the art to heat the reactive substance (i.e., the metal substrate "40") of Jin et al. by resistance heating (i.e., applying a current between the reactive substance and the nanotubes), as taught by either Tanabe et al. or Nagashima et al., with the reasonable expectation of (1) success, as resistance heating is capable of heating metal objects in general, and the substrate of Jin et al. is a metal object, and (2) obtaining similar results (i.e., successfully heating the solid metal to cause a carbon dissolution reaction, regardless of the specific method employed to heat the solid metal).

19. Claims 12 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (USPN 6,283,812 B1) in view of Cohen et al. (USPN 6,231,980 B1) and either Nakai et al. (USPN 4,389,465) or Henney et al. (USPN 3,811,928).

20. Jin et al. teaches all the limitations of **Claims 12 and 30** as set forth above in paragraph 11 or 14, except for a method wherein the nanotube is a boron nitride based nanotube. Specifically, the nanotubes of Jin et al. are carbon nanotubes (Cols.3 – 4). However, the purpose of the process of Jin et al. is to truncate the ends of nanotubes in order to improve the emission properties of nanotube arrays for use in microwave vacuum tube devices and flat panel field emission displays (Abstract, Col.1, lines 7 – 12, and Col.7, lines 54 – 56). Cohen et al. teaches that boron nitride based nanotubes were known in the art at the time of the applicant's invention (Abstract, Col.2, lines 10 – 29, and Col.5, lines 28 – 43) and can be utilized as field

emitters in field emission devices (i.e., the same application as that desired by Jin et al.) (Col.7, lines 53 – 56; Claim 11). Both Nakai et al. (Col.6, lines 36 – 44) and Henney et al. (Col.4, lines 10 – 11) teach that boron nitride is soluble in various metals and/or metallic compounds. Therefore, it would have been obvious to one of ordinary skill in the art to utilize boron nitride based nanotubes in the solid-state dissolution / truncation process of Jin et al. with the reasonable expectation of (1) success, as the process of Jin et al. is utilized to truncate nanotubes (for use in field emission devices) by dissolving the ends of the nanotubes in a material in which the nanotubes are soluble; Cohen et al. teaches that boron nitride based nanotubes can be used in field emission devices; and Nakai et al. and Henney et al. both teach suitable materials in which boron nitride is soluble (and therefore materials that could be used as a hot, solid boron nitride dissolving material "40" in the process of the combination of Jin et al., Cohen et al., and either Nakai et al. or Henney et al.), and (2) obtaining the benefits of utilizing boron nitride based nanotubes in the process of Jin et al., such as extending the aforementioned process from a single species of nanotubes (i.e., carbon) to multiple species of nanotubes (i.e., carbon and/or boron nitride), thereby increasing the versatility of the truncation process. In performing the boron nitride nanotube truncation process, one of ordinary skill in the art would have utilized one of the materials taught by either Nakai et al. or Henney et al. to have boron nitride solubility so that the boron nitride nanotubes could be successfully dissolved and truncated, as desired by Jin et al.

21. Claims 15, 16, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (USPN 6,283,812 B1) in view of Cohen et al. (USPN 6,231,980 B1) and Nakai et al. (USPN 4,389,465).

22. The combination of Jin et al., Cohen et al., and Nakai et al. teaches all the limitations of **Claims 15, 16, 33, and 34** as set forth above in paragraphs 11, 14, and 20. Specifically, as set forth above in paragraph 20, it would have been obvious to one of ordinary skill in the art to utilize boron nitride based nanotubes in the process of Jin et al., along with utilizing an associated material in which boron nitride is soluble (as taught by Nakai et al.) for solid "40" in the process of Jin et al. (see paragraph 34 above). One of the materials having boron nitride solubility taught by Nakai et al. is Si (Col.6, line 43). Therefore, it would have been obvious to one of ordinary skill in the art to use Si as the reactive substance "40" in the process of the combination of Jin et al., Cohen et al., and Nakai et al. with the reasonable expectation of successfully and advantageously using a material (i.e., Si) for the reactive substance "40" that has boron nitride solubility as opposed to carbon solubility, thereby extending the nanotube truncation process from a single species of nanotubes (i.e., carbon) to multiple species of nanotubes (i.e., carbon and/or boron nitride) and increasing the versatility of the truncation process.

Response to Arguments

23. Applicant's arguments filed on 6/28/2004 have been fully considered but they are not persuasive.

24. Regarding the Jin et al. reference, alone or in combination with one or more secondary references, the applicant argues that Jin et al. is quite different from the applicant's claimed invention. Specifically, the applicant states that the claimed invention contacts a nanotube with a reactive substrate having a defined edge, and causes a solid state reaction between a part of the nanotube and the reactive substrate to produce a reaction product having a boundary aligned with the defined edge of the substrate. The nanotube may then be separated from the reaction product at the boundary to define an end of the nanotube. The applicant then argues that none of the methods taught by Jin et al., including rubbing the ends of the nanotubes against a hot solid metal to dissolve the carbon ends in the solid metal, defines an end of a nanotube by producing a reaction in part of the nanotube having a boundary aligned with a defined edge of the reactive substrate, as required by the applicant's claims. The applicant concludes by stating that none of the other references cited by the examiner make-up for the deficiencies in Jin et al.

25. In response, this argument is not convincing. The crux of the applicant's argument is that Jin et al. does not teach or reasonably suggest a method that defines an end of a nanotube by producing a reaction in part of the nanotube having a boundary aligned with a defined edge of the reactive substrate, as required by the applicant's claims. However, as clearly set forth above, Jin et al. does teach the claimed method of defining the end of a nanotube. Specifically, Jin et al. teaches a method of processing a nanotube, specifically a method of forming a tip (i.e., a top) of a (carbon) nanotube (Abstract, Col.3, lines 5 – 49), the method comprising contacting

a selected part of a nanotube (i.e., the ends of the nanotubes desired to be truncated) with a "solid state reactive substrate" (i.e., a solid metal or alloy having a high solid solubility of carbon) having a "defined edge" (i.e., the top of hot solid metal "40") (Figure 3B; Col.6, lines 39 – 43 and 66 – 67; Col.7, lines 1 – 8), heating (i.e., carrying out a heat treatment of) the solid state reactive substrate (Col.7, lines 1 – 4) to cause a "selective solid state reaction", specifically the dissolution of a desired length of the carbon nanotube ends by solid state diffusion (Col.7, lines 4 – 8), in a contacting region of the selected part of the nanotube (i.e., the nanotube ends) and the solid state reactive substrate to have the selected part become a reaction product (i.e., by dissolving only the desired length of the ends of the nanotube) (Col.7, lines 4 – 12), wherein a boundary between the reaction product and the nanotube is self-aligned to the defined edge (i.e., the top of hot solid metal "40") of the solid state reactive substrate (Figure 3B, Col.7, lines 4 – 12). In Jin et al., the "reaction product" is the product formed by the solid state diffusion and dissolution of the carbon nanotube ends into the carbon dissolving metal. As such, the method taught by Jin et al. is a method that defines an end of a nanotube by producing a reaction (i.e., a dissolution reaction) in part of the nanotube having a boundary aligned with a defined edge of the reactive substrate (i.e., in the part of the nanotube that contacts the defined edge of hot solid metal "40"), as required by the applicant's claims.

Allowable Subject Matter

26. Claims 7, 8, 14, 19, 25, 26, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

27. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, alone or in combination, does not teach or reasonably suggest the following limitations in conjunction with the applicant's claimed method of using a solid state reaction to define an end / top of a nanotube: (1) contacting the nanotubes with the substrate by dispersing the nanotubes in an organic solvent, applying the dispersion to the substrate, and evaporating the solvent (Claims 7 and 25); (2) separating the nanotube from the reaction product by rapidly cooling the reaction product (Claims 8 and 26); (3) using Nb as the reactive substrate (Claims 14 and 32); and (4) using a hole formed in the substrate as the "defined edge" (Claim 19).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wesley D Markham
Examiner
Art Unit 1762

WDM

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